

# THE AMERICAN CROW.

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NOTES ON ITS HABITS : NOTABLY FEEDING, NESTING, ROOSTING, FLIGHT,  
RELATIVE ABUNDANCE, ETC., BY VARIOUS OBSERVERS IN  
WIDELY SCATTERED LOCALITIES.

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"*Corvus americanus* is found throughout the United States with the exception of Southern Florida, where it is replaced by the sub-species *floridanus*; and the Central Plains and Southern Rocky mountain regions, where the American Raven (*Corvus corax*) abounds."

More or less abundant where-ever found as a resident or as a migrant, with but one common name, it is perhaps better known to a larger number of people than any other species indigenous to North America.

Held up as emblematic of the fallen, defeated, or unfortunate, the embodiment of cunning and cruelty, and published throughout the land as the personification of a knave and thief; is it any wonder that the ornithologist hesitates to defend the bird whose character is painted as black as its plumage? Like the Blue Jay, whom ignorance and superstition has accused of "carrying sticks to the devil," he is looked upon as the representation of evil, a sort of visible demon; and if he is not just going into mischief, he is popularly supposed to be just returning from it. Persecuted on every hand for many decades, in the East, it is a wonder that the species has not become exterminated. It has certainly decreased in Southern Pennsylvania, though almost imperceptibly, during the last fifteen years. Harmless, and even beneficial two-thirds of the year, prejudice against it begins to wane.

It is not my aim to justify the destruction wrought by these birds upon the cultivated fruit, grain and vegetables, or the eggs and young of wild and domestic birds, for I know it to be considerable at certain seasons of the year; but I fully believe the benefits derived from their destruction of injurious insects, rodents, etc., and their work as scavengers, largely offsets the damage done by them, if it does not indeed over-balance it. This applies to such districts as do not contain an over abundance of the birds.

To the bird's habitual watchfulness and acute senses, the situation of its nest, and to its breeding in the busiest time of the year, can be at-

tributed its abundance to-day. Driven from the field by the hundred and one devices of the husbandman, shot, trapped and poisoned, they will continue to play the part Nature intended they should, and can only become extinct with the extermination of that which gives life to the country—the timber.

We are indebted to the pioneer ornithologists, and to some of the present-day popular writers (the latter making no display of scientific attainments) for almost all we know of the habits of this and many other common species. A well prepared bibliography is beyond the scope of this present article, and the following original notes on the general habits, flight, food, etc., contributed from widely scattered localities, will unquestionably be acceptable to those interested from a scientific or economic standpoint.

Dr. William Brinhurst, Philadelphia, Pa.—“The American Crow remains with us throughout the Winter season, retiring on the accession of severe weather, to thickly wooded, hilly or mountainous regions. I live in a populous part of the city. At sunset Crows may be seen winging their way to their roosting places in New Jersey, returning in the morning and retiring to long distances inland, though some may remain nearer to us. The pine woods of New Jersey affords them a safe retreat. Reedy Island, at the head of Delaware Bay, being solitary and at a distance from the haunts of man, used to be a famous resort for them, and likely is yet. They are astute birds, keeping well out of the way of man, seeming to know a gun from a stick. A pair built a nest in Logan Square and probably raised their young. (See *Situation of Nests*.) As birds, animals, etc., are safe from molestation in these public parks, and can rear their young free from danger of attack by man, they soon acquire a degree of confidence.”

John A. Bryant, Kansas City Mo.—“To the public, the best known bird of all our species is the Crow. This species is noted for its thievishness, and its high degree of cunning seems to go beyond mere instinct. It feeds principally on carrion, fish and insects, and the young and eggs of both birds and reptiles. Last Spring I was a witness to this bird's great voraciousness. I was driving along a country road when I noticed a Crow fly down into a farm yard, close to a hen with a number of chickens about two weeks old; it singled out a straggler, and deliberately pecked it two or three times, entirely disabling it. The chick's cry of distress brought the angry parent to the rescue. The Crow was driven away a few paces; but a moment later, when the hen's attention was drawn away from the wounded chick, the Crow seized his struggling victim, and flying a short distance, devoured it.

“As another case of this species' greediness, as well as its acute sense of

danger, I will relate the following experiment and its result. One day last May, while fishing, I noticed a Crow in the top of a dead tree, fifty yards or more away. It was constantly cawing and apparently watching me. Remembering the old darkey's adage, "A Crow knows a gun," I thought it a good time to test the saying; so picking up my wooden fishing-rod case, I walked toward the tree where the bird was perched some sixty feet from the ground. Having reached the tree I walked around the trunk and back to the creek, where I had left my gun, without the bird taking wing. On reaching the creek, I substituted the gun for the rod case, and again started for the tree. I had scarcely taken a dozen steps ere the Crow decamped to another tree; nor could I approach within gun shot. I then placed my gun on the ground and attempted to get closer, but I found it as wary as before; the sight of the gun had destroyed all former confidence. On my return to the creek, my companion, who was further up the stream, called to me to bring my gun. I immediately complied with his request, leaving the fish I had caught submerged in the water on a string. I was absent probably an hour. On approaching, I observed a Crow sitting on a tree above where I had left the string of fish. Suspecting some mischief from its excited actions, I ran forward quickly to see what was up. The Crow cawed rapidly three or four times and flew swiftly away. Simultaneously from the waters edge, arose two more Crows, acting on the signal given by the sentinel in the tree. As they were eating the fish below the creek bank, they could not possibly have seen or heard my approach. I found nothing remaining excepting ten eyeless heads strung on the cord, the Crows having pulled the string from the water and eaten the fish on the ground.

"The great Crow roosts of the Middle States, famous in pioneer days, seem to have diminished both in number of roosts and individual birds composing them. South west of this city there is quite a large roost, some members of which (400 or more by actual count) pass daily over the city to the Missouri river banks and sand bars, where they glean the refuse and debris washed ashore from the city. They congregate in November and disperse upon the breaking up of the Winter frosts. As the season advances, a half dozen or less may be seen in some pasture or marshy place, where the grass is short, feeding on all kinds of insects and their larve, crustacea, and in fact all animal life too weak to resist or avoid their rapacity. For several seasons past, a flock has frequented a marshy pasture, close to the public road near to the river. Among them could plainly be seen a pure white specimen. So often was it seen, that it became a matter of publication in our daily papers. Many attempts were made to secure this 'White Crow,' but none were successful, as the wary cunning of the 'Black Crow' was predominant."

Lynds Jones, Oberlin, Ohio.—“ In Ohio the Crow is the terror of the corn field, and has been hunted until there is no getting near him. It is not strange if his nesting habits should conform to his general habit of watchfulness. Nests are often one hundred feet up in some such tree as shellbark hickory. I have never found a nest that could be reached without ladders. In Iowa, the Crow is not an enemy to agriculture, and so is not hunted to any considerable extent, but he is nevertheless wary and not easily taken. Flocks are usually composed of less than ten individuals, but I have seen hundreds of Crows gathered together seemingly for some special purpose. There is always a prodigious cawing and much changing of position among the individuals at such a time; but when the flock rises, it disperses in all directions and apparently never comes together again, unless at some other rendezvous. It may be simply a coincidence, but the flocks that have come my way have appeared about noon on an early Spring day. For so large a bird, its nest is remarkably near the ground. I have found many not over ten feet up in a thorn bush or scrubby oak.”

Arthur H. Norton, Westbrook, Me.—“ My observations on the nesting habits of the Crow have been made from Rockland to Portland, Maine, in several localities, but no where more than ten miles from the coast. Near Rockland, especially on the small islands of West Penobscot bay, and also the islands of a portion of Casco bay; the most constant features of the landscape are the dwarfed-spruce woods; but as we retire from the tide mark, on the mainland, we find a diversity of pine, oak, beech, etc., affording the bird a choice of nesting places. The nests that have come under my observation have invariably been placed in species of evergreen trees. The Crows have a habit which seems to be constant, when their nest is nearly completed, of calling in the low, imperfect voice of their young, as we hear them in July. By this means, I have located most of the nests that I have examined.” [Another observer from the same state makes note of this. Can it be a peculiarity of the Maine bird alone?—F. L. B.] “ While common throughout the belt, it does not seem to breed abundantly in any portion of it. Each woodlet or wooded island may be the breeding station of from one to five pairs. Metanic Island, in Penobscot bay, annually supports about five pairs. This number may be stimulated by the desire to pilfer the Night Herons (*Nycticorax nycticorax naevius*), which also breeds here in large numbers. On Crow Island in the same vicinity, the densely foliated white spruce (*Picea alba*) is the chief form of vegetation, and in these trees the birds formerly nested, building very low (about ten feet from the ground). The Island is uninhabited and seldom visited by man. In 1885, the Raven

(*Corvus corax principalis*) took possession and no Crows nested there that season. There is constant warfare between the two species."

H. R. Buck, Wethersfield, Conn.—"Crows are very common with us at all seasons and especially so in Winter. Then they collect in large flocks, probably recruiting from much further north, and keep together pretty well until the breeding season. As a rule they spend the nights in the meadows of the Connecticut River, roosting in large numbers in the black oak trees, which are abundant in many places. At such times they are perhaps less watchful than in the day time, but nevertheless they always have guards posted, day and night. They can seldom be approached without the guards giving the alarm. Some twenty years ago my father shot sixteen by firing the contents of a double-barreled gun into a tree where they roosted. About dawn they begin to stir, and from sunrise until noon there is a steady stream of them flying to the neighboring hills, where they pass the day. Here they feed on berries, seeds, and almost anything they can pick up. They undoubtedly do good by killing larvæ and grubs, which they find under bark and leaves. Warm brooks are among their favorite feeding grounds, and they sometimes come quite close to farm yards in search of such scraps as may be thrown out. When the Spring thaws come, they may be seen almost constantly feeding on the edges of the melting ice, sometimes in company with the Herring Gull (*Larus argentatus smithsonianus*) which often comes up the river. Here they find acorns, berries, and the garbage from towns further up the river. They also collect in large numbers about the city dumps, showing a great fondness for carrion, and all refuse found in such a place.

"As the season advances, they abandon their routine habits, break up into smaller parties, and finally into pairs, when they set about the more serious business of nesting. In this locality they seem to like the sunshine, and avoid the deeper woods. When the eggs hatch, 'then the trouble begins' for the farmers, as the corn comes up about that time and the young birds must eat. I do not think the crows dig up the kernel before it sprouts, but from the time the blade first shows above the ground until it is three inches high, they seem to consider it their lawful property. They pull up the sprouts for the kernels at the end. The Crow does great damage in this way, especially in isolated fields, where the whole crop has sometimes to be replanted. There are two methods in use here for preventing this loss. The first and oldest way is to stretch white cotton strings around and across the field about six feet above the ground. The Crow proverbially is a cunning bird, and when he sees the strings, he expects a trap and seldom goes into the fields. This way has been largely given up on account of its inconvenience and cost. The way now follow-

ed is that of coating the corn with tar. This gives a bitter taste to the kernel, so the Crows let it alone after pulling up one or two spears. The usual way of preparing the corn is to pour hot water over it and let it soak awhile; then for every bushel of corn, put in perhaps a half pint of 'North Carolina tar,' as it is labeled. This is better than the coal tar because it does not have to be melted. The water is then poured off and plaster, ashes, or sand is mixed to keep the kernels from sticking together. This hinders the growth probably a day or two, but it is a perfect protection from the Crows. Last Spring our tarred corn gave out and we finished the last row of one piece with clean corn. After it had come up, we found that the Crows had pulled *every spear* of this corn, while the tarred corn at its side was hardly touched. The damage done to corn is not confined to the first few days. When it is in the milky state, they tear the husks and eat off the kernels at the tips of the ears. The harm done in this way is not great; the Purple Grackles, Red-winged Blackbirds and English Sparrows doing vastly more damage than the Crows. On the other hand, the Crows undoubtedly eat injurious insects, mice, moles, snakes, etc. April 15, 1893, I saw a Crow kill a grass-snake. It would have eaten the snake had not some boys frightened it away. During Spring-plowing the Crows follow in the furrow to get the grubs that are turned up. Crows are much less abundant here to-day than ten years ago, and I am told that thirty years ago there were twenty where now there is one."

Frederick M. Dille, Denver, Colo.—"The American Crow breeds in considerable numbers along the courses of the South Platte and its tributaries in North-Eastern Colorado, although confined principally to the Valley of the Platte. I have found it breeding in the near vicinity of Greely, but from a point about eight miles below the town and down the river I used to find their nests quite abundant. In the groves of native cottonwoods, which are to be found scattered along the streams, the nests would be located; but a sufficient number could rarely be found in the same grove to justify one in saying that it colonizes to any extent. On an island, however, of about two acres extent, located in the middle of the stream, I found at one time five nests all containing eggs or young. The trees here were not as tall by half as those on the main shore opposite, but I suppose the Crows considered it a more secure locality for their nests, and I thought the same at the time, as I waded through the turbulent stream up to my waist in the water, in order to reach the island.

"There have been years when I have traveled not a little up and down the river without finding a nest, nor could I hear of any, by inquiry, from people living at lower points on the river. These periods of total absence

from their favorite localities, would usually follow a mild, open Winter, when the birds stayed with us all Winter, roaming around the farming districts in large numbers, but disappearing as the breeding season approached. Some Winters they stay throughout, and some seasons they breed here, but they seem to lack that fondness for a certain locality, a return to which, Spring after Spring, is characteristic of so many of the smaller birds." [In the East, the evidence tends to prove that the Crow will become attached to a certain locality and will nest in the immediate neighborhood year after year; however they are not so constant nor stubborn as our larger Hawks and Owls, nor as persistent as our Warblers, Thrushes, etc., but as a rule will speedily move their quarters if robbed a few times.—F. L. B.]

W. Harvey McNairn, Toronto, Canada.—“In the Spring or late Winter, just about pairing time, the Crows are here in immense numbers. Sometimes one can see a flock of several hundred. I am of the opinion that Crows from all parts of the country come here to spend the Winter. There is plenty of brush, nearly two hundred acres in a park, where they are protected; but comparatively few stay through nesting time. Some time ago I found an old Crow that had become blind, and afterward heard of several other similar cases; judging from the fuss the others made and the birds sleek appearance, he had been fed by his comrades.” [Doubtless the cause of the bird's blindness can be attributed to the excessive coldness. Several instances were reported last Winter (during a very cold spell) of Crows having their eye-balls frozen and bursted, in Chester County, Pa.—F. L. B.]

Reuben M. Strong, Wauwatosa, Wis.—“For several years the Crows had a roost in a tract of timber near here, occupying it during late Winter and early Spring. In the Spring of 1889 this roost was changed to a grove of conifers on the northern side of the bluff. Several hundred Crows gather at this roost at one time, and in their present location greatly disturb the patients in the sanitarium on the same bluff. A few spend the Winter here, but the bulk does not appear until after the middle of March. Old settlers say that birds of this species were comparatively rare thirty years ago. They seem to be increasing in numbers. Civilization seems to favor them by furnishing them with an abundance of food, and their habits render them comparatively free from its dangers.”

John C. Brown, Carthage, Mo.—“Nests are often found in maple groves, the birds nesting in colonies of six to a dozen pairs. The nest is usually so large that the female cannot be seen from below, while incubating. There are from two to six eggs in a set; in one case seven eggs were found. In this instance, two females must have deposited their eggs

in one nest, as four were of different shape and color from the remaining three. A number of 'runts' have come under my notice, the smallest of which was the size of a large Meadow Lark's egg."

W. S. Cruzan, Sulphur Springs, Texas.—"Crows are very numerous in most parts of this state. The American Crow breeds most abundantly along streams in the central part of the state. The streams are skirted with timber, composed chiefly of pecan, elm, and hackberry. During all times of the year, numbers may be seen. They gather the pecan nuts and eat them, also storing them away for future use. They will often fly from a pecan tree with nuts, to a place on the prairie near some bushes or weeds, and deposit a little pile of nuts, often as much as a pint or more."

Ellis F. Hadley, Dayton, Oregon.—"Crows are very common in the Western part of Oregon, found in flocks in Winter. They live on grain, which they gather after it has been sown, even pulling up the tender shoots. I have seen them come down and eat with the chickens, in flocks of from twenty-five to fifty individuals. They devour a great many insects and worms and are therefore beneficial to the country."

Samuel L. Bacon, Erie, Pa.—"In the Summer of 1886, by shooting at a Crow which was carrying something, evidently a heavy load, I induced it to drop that something, which proved to be a full grown Flicker just dying."

Robert R. Scorso, Afton, N. J.—"The Crow is among our commonest birds, yet its real history is but little known. The farmer generally considers it a costly nuisance, but the scientist is not sure of that. The farmer knows it feeds on grain, and the scientist knows it also feeds on harmful insects. The Crow is largely concerned in the distribution of the poison ivy (*Rhus toxicodendron*) and poison sumach (*Rhus venenata*), although this bird is not the only species concerned in this work."

In the reports just given, no mention has been made of our sable friend's propensity to appropriate the eggs of various domestic fowls, particularly those usually nesting in the field or woods, as the guinea and turkey. When once a nest is found, the happy possessor of the secret is a regular and punctual customer. When a boy, it was one of my many duties to "keep an eye on the turkey hens" during their nesting season, for they would "steal their nests." They generally sauntered toward the brambly fence corners nearest the woods, in an unconcerned manner, slipping quietly on their nests when no one was looking. Often I observed a "Black Crow" at the top of a neighboring tree, impatiently hopping from one foot to the other, spreading and folding his wings, or else



uttering a few low, contented "caws" to himself. I often imagined I heard him "smack his lips" in anticipation of his omelet, and he usually got it in spite of all I could do.

I do not believe the robbing of wild birds' nests by this species is nearly as common as we are led to believe; at least I have not found it so, although I have been witness to an occasional raid made by this bird upon the nests of the Purple Grackle and Robin.

I have examined the stomachs of a number of young in the nest with the following result: April 30, 1892. Four large young. Time, 10 a. m. No. 1 contained broken bits of corn, a leg bone of a meadow mouse, several grubs, some weed seeds, and refuse from barnyard manure. No. 2. Three bones of a mouse or some other small rodent, broken bits of corn, two grains of oats, and some mouse hair. No. 3. Three imperfect grains of corn, three small bones, and grubs, worms, and refuse from the barnyard. No. 4. Grubs, bones of small rodent, three grains of corn, and some weed seeds.

April 30, 1892, 12 noon. Two young, one day old. White grubs only.

May 12, 1892, 7 a. m. Five young, six days old. No. 1. Large quantity of earth worms. No. 2. Earth worms and three beetles. No. 3. Earth worms and three beetles. No. 4. Earth worms and one piece of corn. No. 5. Earth worms and three beetles.

May 8, 1894, 11:30 a. m. One young, two days old. Larvæ of some large insect, probably that of a moth.

When a Crow has tasted the tender chicken, he is in some respects like the man-eating tiger, for he will return again and again until he is shot, or his intended victims are placed well out of his reach. Verily, while "meat is at hand he must eat." If the farmer and poultry fancier would encourage that sturdy little warrior, *Tyrannus tyrannus* (King bird) to nest about the place, they would require no other safeguard during the nesting season at least.

During the Winter of 1893 and 1894, I often had occasion to be in a certain little valley that lies on the borders of Chester and Delaware Counties; many times I have seen the vast flocks just setting out for their morning meal. During the mild weather they roost in the hard-wood timber of this neighborhood. The birds usually fly in an irregular train with no particular order, but I have noticed exceptions to this. One morning just at daybreak, I observed the advance guard of about five hundred rise simultaneously from the woods to my left, and without a single "caw" fly over my head. They were about six deep, the long front dressed with military precision. They appeared to be on the same level. This battalion was followed by four more flocks, all rising successively

from different portions of the woods or from separate groves; all in the same order and about five hundred yards apart. They flew for some distance, probably half a mile, before the individuals on the left swung ahead and led their respective troops. There were not less than twenty-five hundred birds, probably more. At night they retired to the above mentioned timber in one long irregular train; but it is my belief that each flock retained its individuality throughout the day. This large concourse of birds probably represented a small portion of Chester, Delaware and Montgomery Counties; it being highly improbable that there were any migrants from the North or from the mountains of the bordering counties, owing to the almost entire absence of sheltered roosts of evergreen trees. During the colder, and stormiest period of the Winter, these flocks retired to the scattered groves of conifers and cedars of the three counties, usually breaking up in smaller companies, from necessity.

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## NIDIFICATION.

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SITUATION.—The Crow usually chooses a tree situated as deep in the woods as possible, or in some quiet little grove of tall trees, where it can nest free from molestation and yet be near to its chosen feeding ground. The number and variety of eligible situations, the individuality of the bird, the *degree* of hostility prevailing in its neighborhood and the consequent measure of activity displayed by its enemies, having a large share in influencing the selection of a nesting site. Now and then a pair bubbling over with boldness or over confidence in man, will build in an isolated tree, usually but not invariably an evergreen, in the middle of a field or in an apple orchard. Mr. Frederick M. Dille collected a set of eggs from a tall cottonwood, in the midst of a dense grove, on Clear creek, directly on the outskirts of the city of Denver. He says: "I was greatly surprised at finding a pair of Crows breeding in such close proximity to a large city; but the birds were very quiet and retiring, as if they realized the delicacy of their situation." Mr. W. N. Clute, Binghamton, N. Y., cites two instances of this species nesting within the city limits. Dr. William Brinhurst, Philadelphia, Pa., takes note of a pair building in Logan Square, on one side of which stands the Academy of Natural Sciences, on another a grand Cathedral, etc., every front being built around, and the square much frequented. At a later date, the same gentleman informs me that he has *heard* of a nest established among the trees of Independence Square, right in the heart of the oldest portion of

the city. It would surprise me little to learn that this was correct and that this saucy bird had raised its young within touch of the "Cradle of Liberty."

Mr. A. H. Norton, Westbrook, Maine, writes: "The first nests that I have found each season, have been built in trees at the border of an opening or grove, where the snow has disappeared. The point of the compass not, as might seem probable, having influence. The Southern exposure receives the sun's action, but the wind and water frequently are as rapid in melting the snow from northern or north-western exposures. The bird seems to like the sunshine (or society) and avoids the deeper woods." Mr. Henry W. Carriger, Sonoma, Cal., has found the nesting sites extremely variable, finding them in deep woods, groves, and along sloughs. He writes: "Previous to 1891, about ten pairs nested in a grove of young white oaks, but in 1892 not a nest was to be found there. The birds had gone, for some unknown cause, to a large grain-field, about four hundred yards distant, where they built their nests in large white oaks." Mr. Edmund Heller, Riverside, Cal., states that the Crows in that vicinity nest only on the bottom lands, never in the canons nor on the mesa. Large tracts in that section are without their quota of birds. Mr. Samuel L. Bacon, Erie, Pa., writes: "My observations lead me to believe that if unmolested, a pair of Crows will nest in the same vicinity for many years if not for a lifetime. To corroborate this belief, I will say that a pair of Crows (presumably the same pair) have nested for the past four years in one piece of woods, and these four nests are within two hundred feet of each other. In these woods, which covers about three acres, there are the remains of at least ten other nests, and I feel sure they were built by the same pair." Mr. C. W. Crandall has usually found them breeding in low woods, with parts swampy or containing a small pond, on Long Island, N. Y. He also gives some notable situations: One nest fifty feet from a habitation, in a gigantic elm, at the roadside, another, one hundred feet from group of houses; another not more than thirty feet from a railroad in constant use; another, one hundred feet from a nest of Red-shouldered Hawk. Mr. Lionel F. Bowers, Columbia, Pa., and Mr. Arthur H. Norton, Westbrook, Me., have found their nests situated in the midst of Black-crowned Night Heron colonies. I have found them close to the nests of the Cooper's and Broad-winged Hawks, which they will rob if left uncovered for any length of time; and also in one instance, within a few yards of a Grey Squirrel's nest.

The trees usually selected for nesting sites in the Eastern states, are the white pine, *Pinus strobus*; red oak, *Quercus rubra*; chestnut, *Castanea sativa americana*; white spruce, *Abies alba*; white oak, *Q. alba*;

pitch pine, *P. rigida*; scrub pine, *P. banksiana*; hemlock, *Tsuga canadensis*; balsam fir, *Picea balsamea*; double spruce, *A. nigra*; white elm, *Ulmus americana*; red or swamp maple, *Acer rubrum*; tulip poplar, *Liriodendron tulipifera*; and gray or canoe birch, *Betula papyrifera*. Middle states: chestnut, *C. S. americana*; black oak, *Q. c. tinctoria*; white oak, *Q. alba*; hickory, *Carya tomentosa*; shellbark, *C. alba*; pitch pine, *P. rigida*; white pine, *P. strobus*; chestnut oak, *Q. prinus*; red or swamp-maple, *A. rubrum*; red cedar, *Juniperus virginiana*; hemlock *T. canadensis*; beech, *F. ferruginea*; tulip poplar, *L. tulipifera*; white elm, *U. americana*; sugar maple, *A. saccharinum*; white cedar, *Chamaecyparis spheroides*; occasionally white ash, *Fraxinus americana*; wild red cherry, *Prunus pennsylvanica*; wild black cherry, *P. serotina*; flowering dogwood, *Cornus florida*; American holley, *Ilex opaca*; apple, *Pyrus malus*; yellow birch, *B. lutea*; black birch, *B. lenta*; and white birch, *B. a. populifolia*. Southern states: yellow or long leaved pine, *Pinus palustris*; short leaved pine, *P. mitis*; white or spruce pine, *P. glabra*; pitch pine, *P. australis*; cypress, *Taxodium distichum*; live oak, *Q. virens*; beech, *F. ferruginea*; swamp maple, *A. rubrum*; red cedar, *J. virginiana*; elm, *U. americana*; tulip poplar, *L. tulipifera*; pecan, *Carya oliviformis*; and hackberry, *Celtis occidentalis*. Western states: Spanish oak, *Q. falcata*; white oak, *Q. alba*; red maple, *A. rubrum*; Sycamore, *Platanus occidentalis*; cottonwood populus, *monilifera*; beech, *F. ferruginea*; poplar, *L. tulipifera*; white walnut, *Juglans cinerea*; white elm, *U. americana*; tamarack, *Larix americana* or *L. occidentalis*; ash, *Fraxinus americana* and *F. quadrangulata*. California: live oak, *Q. chrysolepis*; white oak, *Q. alba*; willow, *Salix* (?); cottonwood, *P. monilifera*; ash, *F. oregana*; and alder, *Negundo aceroides* (?).

POSITION.—The nest is usually placed in the upright fork or crotch of a tree, not seldom on a horizontal branch, at no great distance from the pole or main stem. Mr. C. W. Crandall discovered a nest on Long Island, N. Y., in a most peculiar and unique position. In his own words: "Looking from the brow of a hill some thirty feet high, I discovered a nest situated in the fork of a chestnut tree, which was at the base of the hill, the nest being placed forty-five feet up. The parent bird was sitting, and strange to say, was entirely visible from where I stood. Thinking this was very peculiar, I resolved to investigate. Upon climbing to the nest, I found that by some means, probably a heavy wind, it had become dislodged and had turned almost completely on its side, the eggs just being held in by the rim of the nest. The bird had to sit with one side against the *bottom* of the nest, with the other side exposed."

HEIGHT.—The distance from the ground at which the nest is placed, varies from four to over one hundred feet. Where the birds are unmolested, they build remarkably near the ground for so large and naturally suspicious a bird. Where they are persecuted and continually hunted, the instinct of self-preservation, with which they are most certainly highly endowed, prompts them to build in practically inaccessible trees, in many cases. Such trees as shellbark hickory, sycamore, large crooked black oaks, trees over-looking precipices or deep water, are often very difficult to climb, and the Crows often build their nests at a great height in these trees. Where the bird chooses an uninhabited island, an unfrequented swamp or the deep woods for breeding purposes, the nest is usually placed much nearer the ground than it would otherwise be. On the whole, mankind exercises more influence over this than is generally known. The average height throughout the country is about forty-five feet. Minnesota, North Dakota, Manitoba are but thinly settled, and the average height from the ground is found to be only twenty feet. The soil of the Eastern states is in a high state of cultivation, and the New England farmer looks with an unkindly eye at the depredations of this black-feathered bird. His search for food is interpreted as a raid which must be resisted by force of arms; hence the bird becomes shyer and builds as high up as it is possible to do. The data before me gives an average of sixty feet above the ground.

CONSTRUCTION.—Mr. Lynds Jones, Oberlin, Ohio, says: "The time taken in building the nest varies with the weather, and that is seldom constant in March or April. I have known a nest to have been begun and completed within a week, in fair weather. But the birds are not constantly at work; theirs' is a very short working day of not over four hours. In bad weather I have known a nest to be three weeks in building." The following interesting table has been deducted from the very full notes furnished me by Mr. Harvey C. Campbell, Lansingburg, N. Y. It is to be understood that in the dates given for *second* sets, in all cases where the eggs were incubated, allowance has been made to give the dates of fresh and completed sets. With numbers 1, 3, and 4 the *actual* dates on which they were taken are given, and it is by no means certain that the last egg was deposited on these dates; quite probable a day had intervened.

		MO.	DA.	
No. 1.	} 1st set.	April	19	} 15 days.
			4	
No. 2.	} 1st set.	April	17	} 14 days.
			1	
No. 3.	} 1st set.	April	17	} 14 days.
			1	

		MO.	DA.	
No. 4	} 1st set.	April	20	} 15 days.
		} 2nd set.	May	
No. 5	} 1st set.		April	23
		} 2nd set.	May	7

We learn from this table that it requires about fourteen days for the Crow, after it has been robbed, to choose a nesting site, construct its nest, and deposit the second set of eggs. Allowing six days for the female to deposit her eggs, the nest must have been constructed within eight days, and probably within six days.

COMPOSITION.—The composition of the nest varies somewhat, of course, with the local surroundings, as well as with the individual builder's experience and "taste" as to the proper material for building. They rarely use a deserted squirrel's nest. The typical nest is composed of coarse sticks, strips of bark, clods of earth, dead leaves; lined with hog bristles, strips of grape vine bark; the inner bark of chestnut or oak, cow hair, or horse hair. Occasionally the body of the nest will contain moss, grass, rootlets, corn stalks, cloth (often from some dilapidated "scare crow"), corn husks, weed stalks, pieces of rope, dried cow and horse manure, feathers, pieces of matting, sheep's wool, twine, or seaweed. The lining is sometimes made up of strips of cedar or juniper bark, dead leaves, sheep's wool, feathers, or skunk's hair. Quite often in some localities, especially in the Eastern states, pine needles are used for lining; while in many other localities, where the surroundings will permit the use of this material, it is not used at all. Much binder twine is made use of in the West. Rev. P. B. Peabody, Owatonna, Minn., writes: "It has apparently become as indispensable a nesting material to the Crow as snake-skins are to the Crested Flycatcher." While Mr. Lynds Jones has the following to say regarding this interesting subject: "First, the foundation of dry sticks, into the bottom or side of which some light colored dry grass is introduced—which is invariably the Crows' 'ear mark.' Felted on this is a layer of leaves, then a layer of grape vine or linder bark, and finally a layer of some soft animal material; in Iowa it is cattle hair, in Ohio it is often wool. In Iowa we now often find nests well supplied with binder twine." In relation to the great strength and durability of the nest in connection with the composition, I can do no better than quote from the notes of Mr. Frederick M. Dille, Denver, Colo.: "I find their nests to be perfect models of strength and durability as compared with other large nests. Not so broad as a Hawk's nest, but deep and well proportioned. So deep and rounded at the bottom that one or two of the eggs will be on top of the others, but well bedded down with some of the lining, so as to avoid all chances of breakage. Made of coarse twigs and

small sticks of the cottonwood, the nest well stuck together by a generous supply of mud or adobe clay, and further strengthened by its situation in some suitable fork of the tree. In this open country of ours, where we have great winds that sweep the trees clear of any other nests, we find that those of the Crow survive them all; and as this species rarely uses an old nest twice over, they provide a great many structures for the Long-eared Owl, Sparrow Hawk, Cooper's Hawk, and sometimes the Great-horned Owl. (The Long-eared Owl prefers a Crow's nest to that of a Magpie's. They do not mind the exposure and sunlight, and they do appreciate the depth which allows them to conceal their stature while incubating.) The principal material used for lining is cattle hair, which in some nests plainly indicates that it was pulled from the hide of some dead 'steer' lying conveniently near on the plains. I have also found nests lined from the scrapings of horse hair from a curry comb; these were probably picked up at favorable moments from around the barn of some isolated ranch. It is well matted against the sides, with a generous supply in the bottom." I would also add the Broad-winged Hawk to the list of birds using old nests of the Crow.

Mr. John A. Bryant writes the following: "Last June I found a nest built in a tall cottonwood standing alone. It was placed on a horizontal limb, midway from tip to trunk, built entirely of green leaves and twigs. The leaves still had a greenish cast, although shriveled, twisted, and brittle. No doubt it was built from the branches blown off by a recent storm. This was about the middle of June. The builders had doubtless been driven from some other locality." I would add that the green leaves were most probably used for greater protection against some foe, possibly man. In this instance the birds showed an instinct almost akin to reasoning, or it is at least a remarkable incident. In North Carolina the nesting material differs somewhat from that already given, as might be expected. Cypress bark, moss, sticks, layer of earth, roots, pea and potato vines; lined with grape vine bark, moss, or hair. The California bird differs in the lining of her nest, more often using the covering of soap root, strips of redwood bark, moss, wild cotton, or cow hair, than anything else.

It is found that the Crow does not vary in the material used, in any one locality, to any great extent; yet there is considerable difference in the construction or the "workmanship," as it has been called. It would seem that the older birds, having the most experience, would construct the better nest. However this may be, some individuals construct more substantial nests than others. When a pair of Crows have been disturbed in their nidification, and are forced to rebuild several times, the result

would naturally be a frail, hastily put together affair; scanty in both material and labor expended. Such a structure came under my notice on May 29, 1887, in a dark, swampy thicket of a mixed growth of trees and saplings, and abounding in greenbriers; at the extremity of a branch of a small, wide-spreading beech tree, fifteen feet above a stagnant pool of water, I found the nest, a mere platform of slender twigs laid together in the manner of a Cuckoo's nest, but without such extra embellishments as pieces of green leaves, tree blossoms, etc., usually found in the latter's domicile. It contained two eggs, and three young birds just hatched. The parent birds successfully reared their brood of three young, and would surely have increased the number to five, had I not arrived just in time to save the two unspotted eggs, which are now included in my large series of sets of this species.

Little attention has been paid to the composition of nests in relation to the seasonal or climatic conditions. This is surprising, considering the many interesting facts which might be brought to light in furtherance of some nicely laid hypothesis. The nest is the direct result of the bird's ingenuity, bounded only by its instinct and surroundings. My notes bearing on this subject were collected during a decade of years, and are sufficiently numerous and accurate to enable me to make the following deductions: Nests built during March and the first week in April, do not differ in external material from the typical nest, but in addition to the strips of soft lining of tree bark and rarely grape vine or cedar bark, *all* nests examined contained an inner lining of some animal substance, of which horse hair constitutes about 50 per cent., hog bristles 40 per cent., and sheep's wool, feathers, and cow hair the remaining 10 per cent. Nests built during the last week in April and during May, are lined with strips of tree and grape vine bark, 63 per cent. containing no other lining, 37 per cent. containing in addition to the above lining, hog bristles; no other animal substance being noted in late nests. While the Crow shows a marked tendency, during the height of the nest-building season, toward gathering indiscriminately whatever comes handiest for lining, the evident knowledge displayed by the early breeders in choosing the warmest material at hand; and the late builders in lining their nests with what is undoubtedly the coolest, speaks highly for the intelligence of the bird. That this does not apply to certain individuals alone, (which may habitually nest early or late as the case may be), is proven by notes at hand of those that have built their second nest after the first had been destroyed. While the bulk of the nest may be the same, they do not place animal material in the lining of the second nest, although the first nest usually contains it. No doubt exceptions will be found to this rule, but I have found it to hold good in all cases under my observation.



MEASUREMENTS.—Full and reliable data on the measurements of the nest are, with a few exceptions, a minus quantity. Few observers think it worth while to take notes of this kind, and the wide latitude taken by those who have recorded the proportions of the nest, renders it extremely difficult to arrive at a safe average. Outside of New York and Pennsylvania, the notes are not sufficiently numerous to give an average of value.

	OUTSIDE.		INSIDE.	
	DIAMETER.	DEPTH.	DIAMETER.	DEPTH.
Average	16.80	10.65	7.35	4.15
Largest	24.00	20.00	9.00	5.00
Smallest	12.00	7.00	6.00	3.00

The above is deducted from data collected in New York and Pennsylvania, and all measurements are given in inches and hundredths of an inch. While the inside measurements do not differ materially between early and late nests, the external measurements do to some extent. The early builder constructs a slightly larger and much more compact nest than the bird building late in the season, *i. e.*, last week in April and first week in May.

## EGGS.

### TIME BETWEEN COMPLETION OF NEST AND DEPOSITION OF FIRST EGG.—

Little or no light has been thrown on this, Mr. Ellis F. Hadley, Dayton, Oregon, asserts that a month intervenes. I have found that the female, if hard-pushed, will deposit her first egg as soon as the nest is completed; at other times, often from four to eight days passed before the first egg was laid.

DEPOSITION OF FULL CLUTCH.—Mr. Lynds Jones has found that if the female be hard pushed, as is often the case when the nest is long in building, the eggs are laid each day until the set is completed, otherwise often a day intervenes, when she is not so pushed. Mr. Victor Dewein, Peoria, Ill., has found that in some cases it takes eleven days to lay a full complement of five eggs. I would say that ordinarily a full clutch is deposited in as many days as there are eggs in the set, in South-eastern Pennsylvania.

NUMBER OF EGGS IN A SET.—It has only been of recent date that the "number of eggs in a set" has received much attention; and many of our most eminent ornithologists and oologists have gotten themselves at once into deep water, when they set down arbitrary figures without suf-

ficient data to back them up. It is evident to all, that where a species has as wide a breeding range as *Corvus americanus*, the number of eggs in a set must naturally vary according to locality and environment. Here Nature shows her wisdom, or rather the guiding hand of the Infinite Creator is here most strikingly shown. In the extreme northern and north-western breeding range of this species, where competition in the struggle for proper and suitable food is freer, the birds are enabled to raise a larger brood than those of the South, where competition is much greater. Another condition exists in the North-east, which is scarcely less powerful than the foregoing—that of persecution. While the bird may be as free from competition of its class as its Western brethren, the persecution or competition with *man* exists in so great a degree as to reduce its feeding ground materially, possibly one-half. Probably no fiercer warfare is waged against this species any-where in the country than in New York and New England. While the maximum number of eggs in a set is as great as or greater than that of the Central and Western states, the average falls below the latter. It is extremely rare to find more than five eggs in a set south of the 30th parallel of latitude. Out of 320 sets, known to be complete, collected in the Humid Province, those taken south of the 36th parallel, from the Carolinian and Austroriparian faunal areas, 50 per cent. are in sets of five eggs each, no larger sets being reported. In the Middle and Eastern states, 54 per cent. are in sets of five or *larger*. In the Western states (only those included in the Humid Province are given), 73 per cent. are in sets of five or larger. The more robust the bird, the greater the abundance of food and relative freedom from persistent persecution, are without doubt conducive to the increase in the number of eggs in a set, as this species is not known to lay more than one clutch in a season, unless the first has been disturbed or destroyed in some manner.

The largest number of eggs in one nest has been reported from Iowa—a “set” of eight eggs. But the fact that four of these eggs were darker, larger, and further advanced in incubation than the remaining four, evidently proves it to be a double set, although but one pair of birds was observed about the nest. A number of sets of seven eggs are without doubt double sets also. The difference in coloration and incubation proving them to be such. That seven eggs are *not sometimes* deposited in a clutch by a single female, I am not prepared to assert; but considering the abundance of the species, I do consider such sets extremely rare. I have never found one, although I have looked into several hundred nests the pasts ten years. Mr. C. W. Crandall, Woodside, Queen’s County, N. Y., has been more fortunate. In answer to an inquiry regard-

ing the matter, he says: "My four sets of seven are *all*, in my estimation, *perfect sets*, laid by their respective females. None being a partnership between two females. Circumstances at the time of taking each set and my investigations satisfy me of this. I knew sets of seven were very rare, but did not think them so extremely scarce as you say. One of my sets of seven shows three distinct types of markings; but I do not consider this point, for I have found the same to occur in sets of four, five, and six eggs each. I do not believe it possible that two female Crows would occupy the same nest, and know of no authentic instance of the kind." A nest containing seven eggs, was found by Mr. Stephen J. Adams, Cornish, Me., May 4, 1887. In his notes, Mr. Adams says: "Three hatched in four days, the balance in seven days." Another instance of which I have full data, is recorded by Mr. A. Mowbray Semple, Poyette, Wis., and is probably a bona fide clutch, and will be treated under the head of "Measurements of eggs."

It has occasionally been my good fortune to secure a set of Crows' eggs, spending probably twenty minutes or more near the tree without attracting the attention of the rightful owners; the belated and enraged birds appearing just as I was preparing to leave. Not every set was fresh, a few contained embryos more or less developed. It has suggested to me the possible chance of a hard pushed alien female, whose own nest had been destroyed, escaping the notice of the rightful owners and depositing her own egg, with those that may be already partially incubated, or may as yet be incomplete as a set; and continuing to do this daily until she has no more to lay. I can account for the apparently double sets in no other way. It is improbable that the Crow is ever polygamous, indeed I believe them to be doubly monogamous.

LOCALITY.	AVERAGE.	LARGEST.	SMALLEST.
N. C., Penn.....	4 or 5	5	3
Penn.....	4 or 5	6	2
N. Y., Ont.....	4 or 5	7	2
New Eng.....	4 or 5	7	1
O., Ind., S. Mich....	5	7	4
Ill., S. Wis., Iowa....	5	7	3
Minn., N. Da., Mana..	5	6	4
Cal.....	4 or 5	6	2
Colo., Neb.....	5	6	3
Wash., Ore.....	5	6	4

When more than one set is laid by a female in one season, the second set *usually* contains one egg less than the preceding set. From the notes received from Mr. Henry Beaumont, Nashville, Tenn., I extract a notable case of continuous nesting. Early in 1892 a pair of Crows took possession of an old nest, probably once belonging to a pair of Hawks;

situated in a poplar tree, ninety-two and a half feet up. The female was shot after depositing three eggs, and the male marked on the left foot by a rifle ball. The male re-mated during the season of 1893, and after remodeling the old nest, and putting in a fresh lining, the female deposited five eggs, which were taken on May 7th. Another set of five eggs was collected six days later (May 13th), and on the 25th both male and female were killed, the nest containing three eggs and the female found ready to deposit the fourth egg. It would appear that after the first five eggs were laid, the female having deposited her full quota, would have no more eggs forming in her ovary; yet within twenty-four hours, assuming that but one egg was deposited daily, she deposits the first egg of the second clutch. This would tend to prove, admitting the above conditions, that the egg is less than twenty-four hours in the complete process of formation, including the shell or calcareous envelope. The time between the loss of the second and beginning of the third clutch is much greater, the female commencing to show signs of exhaustion. She takes about eight days for recuperation and the development of the egg, before oviposition begins anew. Before the completion of this set, the bird is destroyed, thus abruptly ending the interesting observations.

DATES FOR COMPLETE SETS.—Without question, the average dates for fresh and complete sets varies from year to year, according to the existing conditions of the climate. Deep snows, heavy frosts, continuous storms, etc. naturally retard nest-building; and, indeed, puts the birds on the alert to secure subsistence. Often, if the Winter be unusually severe or prolonged, the would-be nest-builders require further time in which to recover their natural strength and hardiness. The dates given below cover a number of seasons, and the averages are reasonably accurate for the purpose; the dates from which they were computed were first reduced by subtracting the number of days of incubation. The dates are therefore for fresh and complete sets.

LOCALITY.	AVERAGE DATE.		EARLIEST DATE.		LATEST DATE.	
	MO.	DA.	MO.	DA.	MO.	DA.
North Carolina.....	April	9	March	24	May	12
Tennessee.....	April	16	March	26	May	25
Pa., N. J., Md.....	April	19	March	29	May	25
N. Y., Ont.....	April	21	April	7	June	7
New England.....	April	28	April	7	June	20
O., Ind., S. Mich.....	April	26	March	26	June	3
Ill., So. Wis., Ia.....	April	15	March	25	May	10
Minn., N. Da., Mana..	May	11	April	20	June	1
California.....	April	16	March	23	May	8
Colo., Neb., Kan.....	April	27	April	1	May	23
Ore., Wash.....	April	30	April	15	May	20

Accordingly, the usual month of nidification throughout the country is the month of April. From North Carolina, north through the Atlantic states, there is a gradual increase in the dates to New England, and west from the Middle states to the boundary of the Humid Province, with the exception of Illinois, southern Wisconsin, and Iowa. The latter averaging earlier than Pennsylvania, which may be accounted for by the absence of notes on large series from any one locality, the numerous but short reports from this section of the country containing records of the earliest sets only. In the Arid Province, California averages later than North Carolina, with Oregon and Washington but two days later than New England. The given average in the Arid Province, with the exception of California, can hardly be relied upon, by reason of the small amount of material collected.

INCUBATION.—It has been seen that the nesting period extends from early March to late June, and that climatic and seasonal conditions greatly influence the birds. Hence, it is evident that to ascertain the correct period of incubation would require considerable self-denial or an unusual talent for original investigation on the part of the amateur. Therefore it is not at all surprising that nothing of value has been received bearing on this subject. I have found the period of incubation to be about fourteen days; but the difficulty of making observations, coupled with the lack of sufficient time to visit the nest whilst the parent bird was off in search of food, and the consequent meagerness of data, compels me to state that I am by no means sure that this is the average period.

Many ornithologists lack the opportunity and others the inclination to penetrate the mysteries of this neglected branch of the science. While we might have fewer eggs to hoard in our cabinets, or proudly exhibit to our oft-times overcurious friends and neighbors, we might secure notes of far greater value from a scientific stand point, and at the same time show our love for the science, if we would pay more attention to this point. That this subject is not open to all is evident. It requires a thorough knowledge of the habits of the species under observation, unlimited time, much patience and often considerable wood craft, with too often disappointment and defeat the only reward.

MEASUREMENTS.—“The majority of widely distributed species are more or less affected by geographical variations, from varying influences of climate and other surroundings.”—*Robert Ridgway*. If this be true in relation to the birds, and the researches by our most eminent scientists have proven it to be so, it must almost necessarily hold good in respect to their nests and eggs. While the nest must vary indefinitely in accord-

ance with its local surroundings and can have no fixed scale of variation, the egg, equally with the bird, must have a fixed and uniform scale of variation in accordance with the latitude or altitude at which it is found, most particularly in size and measurements.

The following table of accurately measured specimens actually collected in the sections named, gives what I believe to be fairly accurate averages, and a surprisingly uniform scale of gradation in size from South to North and from East to West in the Humid Province. Owing to the small amount of data at hand, I am unable to trace an unbroken line of variation in the Arid Province; but from that at my disposal I find the minimum to be on the coast of California, and the maximum in the south-western portion of Washington, with Colorado between. This increase or decrease in measurements in different localities needs no other explanation than that which has already been given as the probable cause of the increase or decrease of the number of eggs in a set; which is too well known to all ornithologists to warrant further comment.

## MEASUREMENTS.

LOCALITY.	NO. OF EGGS MEASURED.	MAXIMUM.	MINIMUM.	AVERAGE.
North Carolina.....	27	1.73 x 1.26	1.48 x 1.08	1.62 x 1.14
Pennsylvania.....	225	2.06 x 1.12	1.42 x 1.05	1.64 x 1.15
New York.....	320	2.03 x 1.33	1.43 x 1.08	1.65 x 1.15
New England.....	97	1.86 x 1.40	1.43 x 1.12	1.66 x 1.17
O., Ind., S. Mich....	44	1.79 x 1.19	1.55 x 1.10	1.68 x 1.17
Ill., S. Wis., Ia.....	132	1.95 x 1.27	1.51 x 1.13	1.68 x 1.18
Minn., N. Da., Mana.	35	1.94 x 1.40	1.55 x 1.17	1.73 x 1.27
California.....	29	1.78 x 1.16	1.48 x 1.03	1.61 x 1.13
Colorado.....	17	1.72 x 1.14	1.59 x 1.13	1.63 x 1.15
Washington.....	14	1.83 x 1.19	1.64 x 1.12	1.71 x 1.18

I also have measurements from Ontario, Maryland, Tennessee, Missouri, Kansas, and Nebraska, but so few in number that the averages could not be that of the localities named, and therefore can have no bearing on the subject. It is safe to make the assertion that there is an increase of about one-hundredth of an inch in the measurements of the average egg, corresponding to an increase of about two and one-half degrees in latitude or its equivalent in altitude. The increase from East to West is not so pronounced nor constant, yet the data at hand shows an average increase of one-hundredth of an inch to a corresponding increase of four degrees of longitude from the Atlantic seaboard to the western limits of the Humid Province. The surprisingly great difference between the maximum and minimum eggs (.64x.35) leads one to speculate on the probable number of eggs of *Corvus americanus* to be found in certain of the innumerable oological collections, masquerading under the

names of *ossifragus*, *caurinus*, *corax principalis*, or perhaps even *cryptoleucus*. The variation between early and late sets is very great in some, and small in other sections of the country. However, some difference does exist, and always in one way. The eggs in the early sets average .06x.03 larger than those of the late sets. The latter are not known to be second sets, but are believed to be those of the more timid and wary birds, building after the leaves have yielded a more effectual screen for their nests. While I have no conclusive proof of it, I believe the earlier sets are those of the older, or more hardy, or better developed birds. It is remarkable that the latter not only produce the larger egg, but also the greater number in a set. In five instances where it is known that the birds laid second sets after the first had been taken, the second sets averaged .02x.01 less than the former, and usually contained one or two eggs less in a clutch.

The average measurements of 979 eggs is 1.65x1.15. This average is *considerably* under that of our professional brethren; yet in all probability no average measurement of the eggs of this species is founded on as numerous and accurate data as is that just given.

It has often been a question to many whether the number of eggs in a clutch has any influence whatever over the size of the egg. It is often remarked that the larger the clutch the smaller the egg, and *vice versa*. This is true to a certain extent; there are, of course, exceptions to all rules; for instance: a set of seven eggs collected in Wisconsin gives an average of 1.69x1.19, which is slightly larger than the true average for that part of the country. A series of sets of seven (if they could be had) might show a very different average.

The following tabulated form will render this more clear.

Average size of	21	sets of	6	eggs each,	1.66 x 1.16
"	80	"	5	"	1.65 x 1.15
"	49	"	4	"	1.66 x 1.18
"	16	"	3 and 2	"	1.61 x 1.13

It will be at once seen that the sets of four average largest, and that the sets of five average precisely the same as the total average of all the eggs measured (this number is without doubt the most normal clutch of *americanus*). The slight increase in the average of the sets of six can readily be explained. In the first place it has been shown that the sets of this number of eggs were all collected very early in the season, and that the supposition is that they were from the most hardy and vigorous birds; and again such clutches are more frequent in the North and West, where all eggs average larger. The sets of two and three eggs each, which were mostly collected late in the season, are probably second or third clutches

of birds that had lost their previous sets, or from aged birds whose productive powers are waning.

In the foregoing summary, no account has been taken of abnormalities or monstrosities. The latter are by no means common, and with the species under consideration, very rare indeed. The "runt" egg which comes under this head, has been attributed to the exhaustion of the productive organs of the female, after producing an unusually large number of eggs, the final egg being not only unnaturally small, but infertile as well. The smallest egg of this species on record was taken by Mr. I. C. Green, Amherst, Mass., with three eggs of the normal size. It contained no yolk, and measures  $1.19 \times .95$ , which is somewhat smaller than the egg of a Saw-whet Owl.

CONTOUR.—COUES, in his *Birds of the Northwest*, says: "In measuring many hundred eggs I have noticed that the variation, however great, is less in absolute bulk than in contour." In view of this it would appear to me that the true and most accurate method, were it practicable, of comparing a large series of eggs with that of another, would be to ascertain the capacity of each and every shell of the species. Whether the result would justify the extra time, risk, and skill employed, I am unable to say. The eggs of the Crow are usually ovate, often running from short ovate to elongate ovate, and less often from short ovate to ovate, in a clutch. Cylindrical ovate and ovate pyriform are very rarely met with in eggs of this species, and oval and spherical only in abnormal specimens, which are frequently if not always infertile. In a set of two eggs taken by Mr. J. C. Brown, Carthage, Mo., May 1, 1893, one egg is of the usual size and shape, the other is almost spherical, measuring  $1.43 \times 1.38$ . To the eye, this egg would appear perfectly round. This set is now in the collection of Mr. J. Warren Jacobs.

COLOR.—In my oological collection, I have a series of sets of the American Crow, from Connecticut, Northern New York, Southern Michigan, Minnesota and Manitoba, nearly all of which can be readily separated from my North Carolina, California, Kansas, and Pennsylvania series by reason of their very dark ground color or heavy markings. The Northern eggs, with some exceptions, exhibit a ground of French-bicechromium- or pea-green, variously spotted and blotched. For Pennsylvania a very light malachite-, chromium- or glaucous-green, are the usual colors, with an occasional set or single of a bice-French- or pea-green, or more often of an indescribable greenish-grey or faded Nile-blue. Eggs from more Southern sections appear even lighter and with fewer dark sets. I have never yet found the "sea green" ground color so often given in the standard works as the typical color of the egg.



The lack of a standard color chart, or possibly in the majority of cases, the absence of any guide whatever other than the eye and the describer's own personal ideas of colors, alone prevents me from tabulating the notes in some form or other, for they are very voluminous and bear evidence of much labor and care. A straw will show the way the wind blows however, and the descriptions emphasize my former remarks under this heading.

That "there is no honor among thieves," is an old saying, yet the Crow has no enemy worth considering that is notoriously addicted to robbing her nest, and protective coloration can have no special significance to any of the genus; and if it were so, the bulky nest would prove an effectual bar to any such hypothesis. We will have to look further for an explanation of the color phenomena. Dr. M'Aldowie in his admirable *Observations on the Development and Decay of the Pigment Layer on Birds's Eggs*, says, "All organic objects which are liable to be exposed to the sun's rays are protected by one color or other." While this may be and probably is true, with a number of exceptions; yet why do the eggs of so many widely distributed species, and the one under consideration in particular, exhibit the heaviest and deepest colors in the more northern portion of their breeding range? That the sun is much more powerful near the equator, no one will question. Admitting that the bird has no power over the color of its eggs, it would appear that the more southern egg would require the most protection and the "survival of the fittest" would have obliterated all pale specimens long ago. The nest is seldom shaded on account of its high position. I have often noted that the brooding bird flies directly away from the sun when unexpectedly startled, and always appears to keep her head directly opposite the sun when sitting, on a warm, sunshiny day. While the tropical and sub-tropical *avianfauna* contains the most gorgeous and richly plumaged species, the eggs are by no means colored in proportion. The leaves probably afford more protection in the South in most cases, but not always; an evergreen affords like conditions where-ever found.

It is obvious to me that the climatic conditions of the North have more influence over the color and coloration by reason of the sudden changes in the temperature from warm to cold, than that of the heat alone; and in lieu of a thicker shell, the pigment is used more liberally, the more robust constitution of the bird rendering this, as well as the production of a larger egg, possible.

COLORATION.—While the average writer may describe the ground color of an egg fairly well, if he has a "Standard Nomenclature of Colors," we all frequently fail to give the reader a clear conception of the coloration.

The Crow egg is particularly difficult to describe ; it is only by close study that the beauty of an egg becomes apparent, a typical egg appearing a dirty olive-brown or olive-green, at a passing glance. The pattern may consist of but one pigment, but that being semi-transparent, the numerous spots and blotches of deep brown are transformed into various olives and the shell markings into greys and dull purples. I have never fully understood these same "shell markings." The same tints are evident in the shells of many other eggs, with varying degrees of brightness, seemingly making no difference whether the shell be white or colored. In my succeeding remarks I will describe the coloration as it appears to the eye.

The usual markings are in the shape of spots and blotches, often so thick as to cover the ground color, usually heaviest at the larger end. Sometimes a set will contain eggs totally unlike in color and markings. Usually the first egg deposited is the most heavily marked and the last egg comparatively lightly marked, often almost spotless. Rarely an egg or set of eggs will be found without a spot or blotch. Such a set is described by me under the head of Descriptions of Sets, and a similar set may be found in the magnificent collection of J. Parker Norris. Rev. P. B. Peabody and others, mention "spotless blue" eggs, but the notes are very meagre. The primary cause of such eggs is undoubtedly that of over-production. The female, by producing an unusual number of eggs, exhausts the contents of the color ducts. The usual markings are of olive-green, olive, and olive-brown, with shell markings of various greys and dull purples. Mr. Stephen J. Adams describes an egg colored exactly like a typical egg of the Red-winged Blackbird (*Agelaius phoeniceus*), but of the average size. Others describe specimens with the coloration in streaks and scrawls. Mr. Samuel L. Bacon gives an example of the similarity of successive sets of eggs laid by the same bird : "I have in my collection two sets of eggs, the similarity of which makes them remarkable. Each set contains four eggs, and I am sure this was the full complement in both cases. The eight eggs are of one size and shape, all being a little shorter and more pointed at smaller ends than is usually the case with Crows' eggs. Each set contains three dark-green eggs and one of a light blue color, with olive markings few and far between. Now these sets were taken from elms (within fifty feet of each other) in an open farming country, and as no leaves were on the trees they could be seen for miles. The first set was taken April 28, 1890, and the second set April 22, 1892, a lapse of two years. To my mind these were laid by the same bird ; but as I unfortunately shot her when she left the second nest, I will never get the set in triplicate." I could give further instances in support of this theory, but consider the above sufficient.

Selected eggs of *Corvus americanus* cannot be distinguished by an expert from those of *caurinus* or *ossifragus*; but there is little danger of any but the most ignorant or dishonest persons confounding the separate species. The same may be said in relation to *C. corax principalis*, and *cryptoleucus*. Some very large and richly marked specimens collected in Minnesota and described by Mr. Walton Mitchel, closely resemble the eggs of the Raven; for instance: "Five eggs. Dark green, spotted with purple and brown, some eggs having blotches on the large ends as large as .90 x .60. Eggs: 1.80 x 1.31, 1.80 x 1.26, 1.79 x 1.28, 1.75 x 1.25, 1.74 x 1.27. Five eggs. Dark green, very heavily marked with lilac-brown and dark purple. 1.94 x 1.40, 1.90 x 1.35, 1.89 x 1.36, 1.89 x 1.38, 1.85 x 1.36. Four eggs. Three eggs light green, spotted with dark brown and purple. One egg, dark green, very sparsely spotted. 1.78 x 1.27, 1.78 x 1.26, 1.74 x 1.22, 1.70 x 1.20." Mr. Frederick M. Dille, says: "Several sets of their eggs will not show as great a variation in color and markings as will sometimes the various eggs in a particular set. In this respect the eggs of the Raven differ, all the eggs in any one set resembling each other very closely. With little difficulty, however, a series of eggs of the American Crow could be obtained which would be very interesting on account of their variation." It is altogether impossible for me to attempt to give an intelligible description of all the variations in the patterns and the coloration of the eggs of this species. Therefore I shall only give a few of the best descriptions, selected more for their variations than for the locality in which they may have been found.

DESCRIPTIONS OF SETS.—The collectors of the various sets are in all instances the describers of their respective sets, unless otherwise stated.

Set I.—May 29, 1887. Berwyn, Chester Co., Pa. Collected by F. L. Burns. 5 eggs. Ground color, an indescribable greyish-green, *unspotted*. Ovate. Three eggs hatched, the remaining two measure 1.54 x 1.16, 1.56 x 1.14.

Set II.—April 15, 1891. Yakima Co., Wash. Collected by W. L. Dawson. 5 eggs. Ground color, an indefinite light greyish-blue, boldly marked with well-defined blotches of dark hair-brown, overlaid with fewer blotches of burnt umber, the blotches of both colors becoming larger about the larger ends; there are a few points of black also. The ground color is not very much obscured except at larger ends. This set is remarkably uniform in coloration. 1.69 x 1.14, 1.71 x 1.16, 1.69 x 1.14, 1.64 x 1.12, 1.66 x 1.16 (Described by Lynds Jones.)

Set III.—April 3, 1893. Shabbona, DeKalb Co., Ill. Collected by W. L. Dawson. 6 eggs. Light bluish-white. General appearance, wood-brown. No. 1. Lilac: moderate blotches, extremely scarce.

Browns : clove and chestnut, in blotches, lines and splashes, very bold and plentiful, larger at large end, otherwise evenly distributed. No. 2. Same, but lilac in spots and blotches less scarce. Light clove-brown markings evenly distributed. Ground color very prominent. No. 3. Same as No. 1, but markings run together, with less clove-brown. Ground color indistinct. No. 4. Same as No. 3, but markings more streaky. No. 5. Same as No. 1, but heaviest at small end. No. 6. Same as No. 1. 1.78 x 1.17, 1.71 x 1.15, 1.75 x 1.19, 1.73 x 1.14, 1.72 x 1.16, 1.82 x 1.15. (Described by Lynds Jones.)

Set IV.—April 3, 1893. Shabbona, DeKalb Co., Ill. Collected by W. L. Dawson. 4 eggs. Light bluish-grey. General appearance, brownish-slate. No. 1. Lilac and lavender in dots, spots and small blotches at smaller end, plentiful in bold blotches and washes at large end, edges of markings ill-defined. A few black markings at large end. No. 2. Same, but lilac and lavender in much heavier pattern and more abundant, nearly hiding ground color and forming a great blotch on large end. No. 3. Same as No. 1, but markings less heavy. No. 4. Same as No. 3, but browns more plentiful and edges well defined; markings confluent at large end only. Black in lines and spots on large end, plentiful. 1.70 x 1.20, 1.76 x 1.21, 1.86 x 1.17, 1.69 x 1.20. (Described by Lynds Jones.)

Set V.—April 7, 1893. Shabbona, DeKalb Co., Ill. Collected by W. L. Dawson. 2 eggs. Ground color obscured, appears to be light blue-grey. No. 1. Lavender and chestnut-brown in small oblong blotches, very uniform. No. 2. Same, but in addition, bold blotches of clove-brown at each end, confluent at large end. 1.70 x 1.15, 1.75 x 1.17. (Described by Lynds Jones.)

Set VI.—April 27, 1890. Lansingburg, N. Y. Collected by Harvey C. Campbell. 5 eggs. Nos. 1 and 2. Pale greenish-blue, speckled with olive-green and underlined with lavender-grey. Nos. 3 and 4. Ground color darker, thickly marked with spots and blotches of olive-green intermingling with cinerous. No. 4 has the addition of mouse-grey in splashes at larger end. 1.54 x 1.14, 1.60 x 1.13, 1.67 x 1.11, 1.57 x 1.15.

Set VII.—April 7, 1893. Shabbona, DeKalb Co., Ill. Collected by W. L. Dawson. 3 eggs. Ground color pale greenish-blue. General appearance speckled green. Nos. 1 and 2. Lavender spots and dots very numerous, bold blotches and wide heavy splashes not very numerous. Clove-brown in small blotches and bold splashes, not very numerous. All markings uniformly distributed. No. 3. Same, but with larger markings more numerous at large end. 1.65 x 1.15, 1.60 x 1.13, 1.83 x 1.23. (Described by Lynds Jones.)

Set VIII.—May 1, 1893. Carthage, Mo. Collected by John C. Brown.

2 eggs. Pale bluish-green, with yellowish tinge. The normal specimen has bold blotches of greyish-brown, and small spots of deep shades of brown, chiefly at large end. The abnormal egg is almost round and marked with same colors, which are thickest in clusters on each end. 1.56 x 1.22, 1.43 x 1.38. (Described by J. Warren Jacobs.)

Set IX.—April 14, 1873. Waynesburgh, Green Co., Pa. Collected by J. Warren Jacobs. 5 eggs. Light bluish-green. Nos. 1, 2 and 3. Very heavily marked, but chiefly at larger ends, with yellowish-drab, brown and slate. No. 4. Same colors moderately distributed. No. 5. Almost devoid of markings. 1.95 x 1.15, 1.91 x 1.18, 1.86 x 1.19, 1.66 x 1.15, 1.78 x 1.19.

Set X.—April 29, 1893. Amherst, Mass. Collected by I. C. Green. 5 eggs. Ground color very light green in two eggs, darker in the remainder. Spotted and blotched with olive, brown and lilac, very thickly. 1.63 x 1.09, 1.50 x 1.07, 1.58 x 1.12, 1.59 x 1.14, 1.52 x 1.11.

Set XI.—April 30, 1890. Tredyffim Twp., Chester Co., Pa. Collected by F. L. Burns. 4 eggs. Eggs very small. Light Nile-blue, almost light glaucous-green, with small shell markings of drab, smoke and olive-grey. Spotted and blotched with olive-green, olive-brown, and a few specks of clove-brown chiefly at larger ends. Ovate. 1.53 x 1.09, 1.52 x 1.10, 1.53 x 1.07, 1.47 x 1.08.

Set XII.—April 10, 1889. Grinnell, Ia. Collected by Lynds Jones. 4 eggs. Light Nile-blue. No. 1. Very heavily and uniformly overlaid with bold markings of wood- and hair-brown, the latter predominating. No. 2. Less heavily overlaid with same colors in smaller pattern, blotches largely confined to larger end; also two large blotches of black at larger end, and numerous small ones evenly distributed over the entire surface. No. 3. Markings very sparse and vague, chiefly of wood-brown, here and there assuming a streaky appearance. No. 4. Markings very sparse and almost entirely streaky, of a pale wood-brown, a blotch of hair-brown at the extremity of a streak here and there, looking as if a drop of color had dried on after staining the shell in the streak. 1.71 x 1.16, 1.70 x 1.17, 1.54 x 1.18, 1.42 x 1.10.

Set XIII.—April 18, 1893. Grinnell, Iowa. Collected by Lynds Jones. 6 eggs. Type specimen: very light Nile-blue, thickly overlaid with small blotches of wood-brown, and lavender shell markings scarcely discernible; the whole overlaid with large, well-defined blotches of hair-brown; all markings evenly distributed, giving the egg a greenish-brown appearance. Two other eggs heavily blotched with same colors. Two other eggs have relatively but few of the inner blotches and shell markings, hair-brown being the principal color. Last egg sparsely marked, a few

large blotches at larger end, ground color very prominent. 1.74 x 1.20, 1.70 x 1.20, 1.66 x 1.20, 1.66 x 1.19, 1.65 x 1.16, 1.65 x 1.15. Eggs uniformly ovate, a very little elongate.

Set XIV.—April 25, 1892. Oberlin, Ohio. Collected by Lynds Jones. 5 eggs. Type specimen very light Nile-blue, with a few small markings of wood-brown and lavender, these very heavily overlaid with great blotches of wood- and hair-brown in about equal quantity and size. Many of these blotches are .20 x .60. There are three eggs of this type. No. 4. Much the same but the blotches are smaller and more indefinite. No. 5. Very much lighter, with very few small markings or large blotches except at larger end; and with more lilac shell blotches, sparsely and evenly distributed. Nos. 1 to 4 are almost ovate pyriform, while No. 5 is almost elongate ovate. 1.79 x 1.19, 1.74 x 1.20, 1.73 x 1.20, 1.72 x 1.20, 1.71 x 1.19.

Set XV.—April 30, 1891. Yakima Co., Wash. Collected by W. L. Dawson. 5 eggs. Light Nile-blue. Type, evenly distributed dots and spots of wood-brown and blotches of same and hair-brown, sparsely sprinkled with black dots, all markings having clear-cut edges, and the ground color conspicuous. Nos. 2 and 3. Much more heavily marked with a uniform wood-brown, these markings having a streaky appearance, looking as if they had been rubbed from large end down while still damp; this peculiar pattern is confined to the middle regions. No. 2 has a large triangular and several small irregular lines of dark clove-brown immediately above the pole of the large end. No. 3 has only faint traces of the color in a few indefinite lines and spots over the entire egg. No. 4. Very sparsely with small, and indefinitely defined markings of wood-brown, with black dots scattered evenly over the egg, and a great irregular broken *raised* blotch of black on larger end, which looks like dried tar. No. 5 is very evenly marked with well defined but small blotches of lavender under the wood-brown, giving it a clean freckled appearance. 1.73 x 1.20, 1.61 x 1.19, 1.60 x 1.18, 1.62 x 1.22, 1.57 x 1.19. (Described by Lynds Jones.)

Set XVI.—April 14, 1886. Valley Forge, Montgomery Co., Pa. Collected by F. L. Burns. 4 eggs. Palest possible tint of glaucous-green. No. 1. Regularly, almost completely over-laid with olive-green, heaviest at larger end; a few specks of clove-brown noticeable. No. 2. Regularly spotted and blotched with olive-green, heaviest at smaller end, a few specks of clove-brown and some olive-grey shell markings noticeable. No. 3 has the most olive-grey shell markings of any of the set. It is lightly spotted and blotched with olive-green. No. 4 is similar to No. 3, but more sparingly marked. This set gradates from heavy to light markings. Ovate. 1.54 x 1.12, 1.59 x 1.15, 1.51 x 1.11, 1.53 x 1.13.

Set XVII.—April 30, 1891. Bradford Hills, Chester Co., Pa. Collected by F. L. Burns. 4 eggs. Light glaucous-green, spotted, blotched and smeared with olive-green and clove-brown. No. 2 shows shell markings of olive-grey. Ground color shows but indistinctly. Ovale.  $1.75 \times 1.15$ ,  $1.66 \times 1.17$ ,  $1.75 \times 1.11$ ,  $1.66 \times 1.10$ .

Set XVIII.—April 30, 1890. Phoenix, N. Y. Collected by Claude Cornelle Maxfield. 3 eggs. Nos. 1 and 2. Light glaucous-green, spotted and blotched with olive-green, olive-brown, and a few scratches of clove-brown about large ends. A few shell markings of mouse-grey are noticeable here and there. No. 3. Light Nile-blue, almost unmarked, except at large end; here blurred shell markings of mouse-grey, with a few small spots of clove-brown and black are scattered over the surface. The texture of the shell is rough, porous and dull. Elongate ovate to ovate.  $1.56 \times 1.15$ ,  $1.59 \times 1.18$ ,  $1.61 \times 1.06$ . (Described by F. L. Burns, from eggs kindly loaned by C. C. Maxfield.)

Set XIX.—May 9, 1892. Poynette, Wis. Collected by A. Mowbray Semple. 6 eggs. Five eggs light sea-green. No. 6. *White*: marked with umber in spots from the size of a pin head to double that size. Five eggs average  $1.68 \times 1.20$ , the 6th egg  $1.65 \times 1.15$ .

Set XX.—April 20, 1890. Lansingburgh, N. Y. Collected by Harvey C. Campbell. 5 eggs. No. 1. Light sea-green. Covering the entire egg are spots, dots and longitudinal markings of olive-green, thickest at larger end. The four remaining eggs are a shade lighter. No. 2. Blotched and spotted with clove-brown, olive-green and mouse-grey. Nos. 3, 4, and 5 are spotted and blotched with olive-brown and olive-green.  $1.63 \times 1.12$ ,  $1.76 \times 1.15$ ,  $1.70 \times 1.16$ ,  $1.71 \times 1.16$ ,  $2.01 \times 1.25$ .

Set XXI.—April 26, 1890. Lansingburgh, N. Y. Collected by Harvey C. Campbell. 6 eggs. This is the handsomest set of Crows' eggs I have ever seen. The ground color of Nos. 1, 2, and 3 is light sea green, almost malachite-green. The markings are large and irregular in shape, more properly called blotches. No. 1. The markings are numerous and evenly distributed over the entire surface, except a large blotch at the larger end, crescentic in shape and measuring about .80 in length. These markings are of clove-brown, with smaller markings of olive-green or olive-brown. No. 2. Similar to No. 1, but the blotches are not so large, yet almost blending in one large blotch at larger end. There are some longitudinal markings resembling pencil lines, of a light olive. No. 3. Same as the above with the addition of a circular blotch, .45 in diameter, at larger end. The pencil-like markings are more numerous than on No. 2. No. 4. Sage-green. sprinkled sparsely with small blotches of olive-green, underlying this are spots and blotches of cinereous, more numerous

at large end. No. 5. Lighter than first three eggs, sparsely spotted and blotched with olive-green, except at larger end where they cluster together. There is one large blotch of mouse-grey at larger end, entirely concealing the ground color. Some blotches of cinereous are scattered over the surface. No. 6. Darker than the first three eggs, blotched and spotted with clove-brown and olive-green. First three eggs resemble each other closely, the remaining three are entirely different from one another, and from the first three eggs. 1.65 x 1.07, 1.64 x 1.08, 1.64 x 1.11, 1.60 x 1.09, 1.47 x 1.11. (6th egg broken.)

Set XXII.—April 17, 1892. Lansingburgh, N. Y. Collected by Harvey C. Campbell. 5 eggs. 4 eggs light sea-green, thickly *clouded* with small markings of olive-green, olive-brown and mouse-grey. No. 5. Pale bluish, marked sparingly with olive-green, bistre, cinereous, and several minute dots of lilac-grey. 1.68 x 1.12, 1.66 x 1.16, 1.58 x 1.11, 1.55 x 1.10, 1.55 x 1.11.

Set XXIII.—May 2, 1892. Centre Rutland, Vt. Collected by Wait C. Johnson. 2 eggs. No. 1. Light sea-green, spotted with dark-brown. No. 2. Rather unique; light olive-green, with few spots at small end, but the ground color on large end almost obscured by blotches of deep brown, almost black. Three of these blotches are about the size of dimes. 1.62 x 1.12, 1.70 x 1.19.

Set XXIV.—April 16, 1893. Boone Co., Iowa. Collected by Carl Fritz Henning. 5 eggs. This is a pretty set and shows a variety of markings. One egg is light sea-green, heavily blotched at larger end with light-brown, olive-brown and umber. No. 5 is a darker egg, blotched all over the larger end with dark and olive-green, and dotted with umber and black. The remaining three eggs are between the light and dark ground colors, heavily marked over the entire eggs with brown and umber. 1.67 x 1.16, 1.71 x 1.15, 1.60 x 1.17, 1.70 x 1.13, 1.68 x 1.17.

Set XXV.—May 12, 1893. St. Paul, Minn. Collected by Walton Mitchell. 6 eggs. Five eggs light sea-green, heavily spotted with brown and purple; one egg light blue, one large blotch of brown and a few purple markings on the large end. 1.56 x 1.20, 1.60 x 1.27, 1.60 x 1.27, 1.62 x 1.30, 1.62 x 1.29, 1.65 x 1.30.

Set XXVI.—April 10, 1886. Tredyffim Twp., Chester Co., Penn. Collected by F. L. Burns. 5 eggs. No. 1. Malachite-green, spotted and blotched with olive-green and olive-brown. No. 2. Chromium-green, marked similarly to No. 1; a few shell markings of drab-grey noticeable. No. 3. Light glaucous-green, with a few shell markings of drab-grey; spotted and blotched with olive-green, olive-brown, and a few small spots and dashes of clove-brown at large end over all. No. 4.



Malachite-green, with olive-grey markings in large pattern, becoming confluent at and around small end; only partly overlaid with olive-green, olive-brown, and some clove-brown. A very handsome egg. No. 5. Light Nile-blue, almost unspotted, save the larger end, which shows a few shell markings of olive-grey, some spots and one large blotch of olive-brown and less clove-brown. This set is unique and beautiful. Ovate and elongate ovate. 1.76 x 1.18, 1.68 x 1.21, 1.69 x 1.22, 1.76 x 1.25, 1.57 x 1.23.

Set XXVII.—April 22, 1887. Diamond Rock, Chester Co., Penn. Collected by F. L. Burns. 6 eggs. 5 eggs light malachite-green, a few dots and spots of olive-grey shell markings, thickly freckled with olive-green, olive-brown, and at larger ends with clove-brown. No. 6. Light Nile-blue, sparsely flecked with the above colors. Elongate ovate. 1.78 x 1.14, 1.75 x 1.12, 1.77 x 1.20, 1.78 x 1.13, 1.70 x 1.16, 1.75 x 1.08.

Set XXVIII.—March 30, 1889. Hammer Hollow, Chester Co., Penn. Collected by F. L. Burns. 5 eggs. This is a typical set. Ground color light malachite-green, with spots and blotches of olive-green, olive-brown, and clove-brown. All markings clear and pronounced, most numerous at large ends. Ovate to elongate ovate. 1.79 x 1.18, 1.75 x 1.20, 1.70 x 1.15, 1.77 x 1.15, 1.67 x 1.19.

Set XXIX.—May 9, 1890. Mt. Airy, Chester Co., Penn. Collected by F. L. Burns. 3 eggs. Very light malachite-green, markings small, numberless, and indistinct, ground color showing prominently. There are numerous shell markings of cinereous, olive and smoke-grey. Spotted with olive-green, olive-brown and a few specks of clove-brown. Elongate ovate. 1.64 x 1.01, 1.64 x 1.00, 1.64 x 1.07.

Set XXX.—April 24, 1893. Easttown Twp., Chester Co., Penn. Collected by F. L. Burns. 5 eggs. A remarkable set in shape and measurements. 4 eggs light malachite-green, with some shell markings of drab-grey; spotted and blotched with olive-green, olive-brown, and a little clove-brown. The markings confluent at the large ends only. No. 1 has blotch of olive-green, partly overlaid with olive-brown, at large end. This blotch is one inch in diameter, and is partly overlaid with a network of black. No. 5. Light glaucous-green, with small markings of heliotrope, purple and lavender; spotted and blotched with well defined markings of olive-green and olive-brown. *Cylindrical* ovate. 2.06 x 1.12, 2.01 x 1.15, 1.94 x 1.13, 1.75 x 1.10, 1.82 x 1.15.

Set XXXI.—April 9, 1893. Weaverville, N. C. Collected by I. S. Cairns. 4 eggs. Nos. 1 and 2. Pale malachite-green, blotched and spotted with mouse- and olive-grey; overlaid with sepia and bistre, chiefly at large ends where the color becomes confluent. Nos. 3 and 4.

Dull pea-green. No. 3, regularly and sparsely covered with hair-, wood- and clove-brown markings. No. 4 has the appearance of being smeared with clove- and olive-brown about larger end; remainder of egg unspotted, with the exception of some minute dots of the same colors. The surface of this egg is rough and ridgy. Ovale.  $1.68 \times 1.20$ ,  $1.62 \times 1.21$ ,  $1.59 \times 1.18$ ,  $1.71 \times 1.16$ . (Described by F. L. Burns.)

Set XXXII.—April 6, 1892. Weaverville, N. C. Collected by I. S. Cairns. 5 eggs. From light malachite- to light glaucous-green. 3 eggs thickly spotted with olive-green and clove-brown, but the ground color showing prominently. No. 4. Shell markings of olive-grey, very sparsely spotted with olive-green. No. 5. Mouse-grey shell markings, very numerous about smaller end; with a sprinkling of clearly defined spots of olive-green. Ovale.  $1.60 \times 1.14$ ,  $1.57 \times 1.14$ ,  $1.60 \times 1.12$ ,  $1.57 \times 1.09$ ,  $1.52 \times 1.13$ . (Described by F. L. Burns.)

Set XXXIII.—April 6, 1893. Weaverville, N. C. Collected by I. S. Cairns. 5 eggs. From a light glaucous-green to a pale pea-green. Rather sparsely spotted and blotched with olive-green and olive-brown, some mouse-grey markings appearing beneath. Ovale.  $1.68 \times 1.21$ ,  $1.69 \times 1.19$ ,  $1.69 \times 1.18$ ,  $1.65 \times 1.19$ ,  $1.59 \times 1.17$ . (Described by F. L. Burns.)

Set XXXIV.—May 22, 1892. Meeker Co., Minn. Collected by Herman Hershey. 5 eggs. Malachite-green. Nos. 1 and 2, have shell markings of mouse-grey and cinereous, almost completely overlaid with blotches and longitudinal streaks of olive-green, sage-green, and a few minute markings of clove-brown noticeable at larger ends. Nos. 3, 4 and 5. Numerous shell markings of mouse-grey and cinereous, distinct and not overlaid with color; spotted and blotched with olive-green, olive-brown, and clove-brown in larger spots than on first two eggs. Ovale.  $1.65 \times 1.17$ ,  $1.61 \times 1.18$ ,  $1.55 \times 1.17$ ,  $1.54 \times 1.16$ ,  $1.60 \times 1.20$ . (Described by F. L. Burns.)

Set XXXV.—April 1, 1893. Coffeyville, Kan. Collected by George N. Upham. 5 eggs. Nos. 1, 2 and 3. Light green, streaked with olive-green and olive-brown. No. 4. Light green, blotched at larger end, especially with dirty brownish-green. No. 5. Light bluish-green, thickly spotted at large end with olive-green and lilac; the remainder of the egg spotted with lilac shell markings. I never saw a Crow egg like it; it looks like a Magpie's egg. The last two eggs measure  $1.77 \times 1.24$ ,  $1.75 \times 1.15$ .

Set XXXVI.—May 2, 1885. Weed Co., Colo. Collected by Frederick M. Dille. 6 eggs. Bright light-green, but marked in such various patterns and degrees of intensity as to produce quite a variation in the set. One of the eggs is marked throughout with large dark spots; another with smaller blotches of two shades of brown, gathered around larger

end ; while two of the eggs are so streaked and smeared with brown as to almost hide the ground color. 1.63 x 1.16, 1.65 x 1.15, 1.68 x 1.15, 1.66 x 1.17, 1.67 x 1.16, 1.60 x 1.17.

Set XXXVII.—April 30, 1891. Bradford Hills, Chester Co., Penn. Collected by F. L. Burns. 4 eggs, but only 2 saved. Ground color pea-green. No. 1. Thickly spotted and blotched with olive-green and olive-brown. No. 2. Several large shell markings of drab- and olive-grey, overlaid with spots and blotches of olive-green, olive-brown, and a few scrawls of clove-brown at small end. Ovate to elongate ovate. 1.81 x 1.21, 1.68 x 1.21.

Set XXXVIII.—April 19, 1886. Berwyn, Chester Co., Penn. Collected by F. L. Burns. 4 eggs. 2 eggs light bice-green, and two light chromium-green, thickly speckled and spotted with olive-green, some olive-brown, and a few shell markings of olive-grey. Elongate ovate. 1.80 x 1.17, 1.79 x 1.20, 1.77 x 1.17, 1.77 x 1.17.

Set XXXIX.—April 14, 1893. Sonoma Co., Cal. Collected by Henry W. Carriger. 5 eggs. 3 eggs light bice-green, very thickly spotted and blotched with olive-green and olive-brown. No. 4. Very light malachite-green, spotted and blotched with olive-green and olive-brown. No. 5. Light Nile-blue, with faint shell markings of mouse- and drab-grey, sparsely overlaid with spots of olive-green and olive-brown. Ovate. 1.60 x 1.17, 1.61 x 1.17, 1.56 x 1.16, 1.54 x 1.15, 1.57 x 1.14.

Set XL.—May 5, 1893. Westbrook, Me. Collected by Arthur H. Norton. 1 egg. Pea-green, heavily blotched with olive, irregular in distribution, but chiefly at larger end ; also pencilings and spots of black at large end. 1.78 x 1.22

Set XLI.—April 10, 1886. Valley Forge, Montgomery Co., Penn. Collected by F. L. Burns. 5 eggs. No. 1. Chromium-green, a few shell markings of olive- and mouse-grey, overlaid with olive-green, olive- and clove-brown. No. 2. Light bice-green, marked heavier than the above with the same colors. No. 3. Pea-green, same as the above, but has a more streaky appearance. Nos. 4 and 5. Lightest possible tint of glaucous-green, with colors of No. 1 in streaks and dashes, pattern rather indistinct. Elongate ovate, 1.75 x 1.11, 1.74 x 1.11, 1.64 x 1.11, 1.74 x 1.13, 1.68 x 1.06.

Set XLII.—April 20, 1889. Berwyn, Chester Co., Penn. Collected by F. L. Burns. 5 eggs. A very pretty set. 2 eggs light chromium-green, with shell markings of mouse-, drab- and olive-grey, confluent at larger end in one and at smaller end in the other ; overlaid with olive-green and olive-brown. Where the grey clusters thickest, it is overlaid with small spots and scrawls of clove-brown. Nos. 3 and 4. Light glaucous-green,

with shell markings of mouse. and olive-grey, overlaid with spots and blotches of olive-green and brown, a few spots of clove-brown at large end. Markings every where bold and distinct. Ovale.  $1.73 \times 1.24$ ,  $1.63 \times 1.24$ ,  $1.72 \times 1.23$ ,  $1.72 \times 1.24$ .

Set XLIII.—April 23, 1893. Ransom, Mich. Collected by E. Arnold. 1 egg. Chromium-green. Spotted and blotched with olive-green and olive-brown. Ovale.  $1.69 \times 1.20$ . (Described by F. L. Burns.)

Set XLIV.—April 23, 1892. Cayuga Co., N. Y. Collected by John Minchin. 5 eggs. No. 1. Chromium-green, with olive- and smoke-grey shell markings, very heavy and confluent over the large end; heavily overlaid with olive-green markings. No. 2. Bice-green with same markings. No. 3. Bice-green, blotched and spotted heavily with olive-green and some clove-brown. Nos. 4 and 5. French-green, heavily marked with olive-green, overlaid with blotches of olive-brown and specks of clove-brown. A very dark set. Almost sub-pyriform.  $2.03 \times 1.33$ ,  $1.72 \times 1.16$ ,  $1.68 \times 1.14$ ,  $1.65 \times 1.16$ ,  $1.68 \times 1.12$ . (Described by F. L. Burns.)

Set XV.—April 23, 1893. Ransom, Mich. Collected by E. Arnold. 4 eggs. 3 eggs French-green, blotched and spotted with olive-green, overlaid with heavy markings of clove-brown. No. 3. Showing a few shell markings of olive-grey. General appearance is bottle-green. No. 4. Light glaucous-green with numerous shell markings of olive-grey, sparsely spotted and blotched with raw-umber and clove-brown.  $1.77 \times 1.21$ ,  $1.73 \times 1.23$ ,  $1.68 \times 1.21$ ,  $1.58 \times 1.21$ . (Described by F. L. Burns.)

Set XLVI.—May 7, 1893. Ransom, Mich. Collected by E. Arnold. 5 eggs. 4 eggs light French-green, with shell markings of olive-grey; thickly and evenly spotted and blotched with olive-green, olive- and clove-brown. No. 5. Glaucous-green, with olive-grey shell markings, spotted and blotched with olive-green, olive- and clove-brown, principally at large end. 4 eggs very dark, one light. Ovale.  $1.70 \times 1.21$ ,  $1.69 \times 1.22$ ,  $1.70 \times 1.21$ ,  $1.70 \times 1.22$ ,  $1.71 \times 1.21$ . (Described by F. L. Burns.)

Set XLVII.—May 5, 1893. Clear Creek, Jefferson Co., Colo. Collected by Frederick M. Dille. 6 eggs. Ground color intense green (French-green). Markings heavy and distinct of olive-green and brown. One egg streaked and one marked around smaller end.  $1.60 \times 1.12$ ,  $1.62 \times 1.12$ ,  $1.64 \times 1.17$ ,  $1.59 \times 1.13$ ,  $1.72 \times 1.14$ ,  $1.65 \times 1.14$ .

Set XLVIII.—April 21, 1891. Lansingburgh, N. Y. Collected by Harvey C. Campbell. 5 eggs. 4 eggs sage-green, clouded heavily with olive-grey and spots of olive-green. No. 5. Pale bluish-green, thickly spotted and blotched with olive-green, olive-brown and mouse-grey.  $1.67 \times 1.14$ ,  $1.69 \times 1.13$ ,  $1.54 \times 1.14$ ,  $1.64 \times 1.12$ ,  $1.70 \times 1.14$ .

Set XLXI.—April 17, 1892. Lansingburgh, N. Y. Collected by Harvey

C. Campbell. 4 eggs. No. 1. Sage-green, profusely marked with longitudinal streaks of olive-green, and one or two dots of clove-brown at larger end. No. 2. A trifle lighter in ground color, marked with large blotches of olive-green and olive-brown, with smaller spots of same colors. One blotch is 1.05 in length running lengthwise of the egg. No. 3. Lighter than No. 2 and marked the same. No. 4. Same as No. 3, with addition of mouse-grey. 1.71 x 1.17, 1.71 x 1.17, 1.64 x 1.17, 1.69 x 1.15.

Set L.—April 9, 1893. Boone Co., Iowa. Collected by Carl Fritz Hemming. 5 eggs. 3 eggs dark olive-green, thickly spotted and blotched with dark-brown and fine blotches and dots of black; one of the three evenly marked, another heavily blotched at the large end, and the third at the small end. The remaining 2 are a lighter olive-green, blotched with lighter brown and a few black dots, chiefly at the larger end. 1.54 x 1.15, 1.67 x 1.13, 1.55 x 1.17, 1.55 x 1.16, 1.56 x 1.14.